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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,800	10/28/2005	Keiji Nagai	125024	3966

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EXAMINER	
BERMAN, JACK I	
ART UNIT	**PAPER NUMBER**
2881	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,800	NAGAI ET AL.	
	Examiner	Art Unit	
	Jack I. Berman	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *15-17 and 20* is/are withdrawn from consideration.

5)☒ Claim(s) *11-14* is/are allowed.

6)☒ Claim(s) *1-10,18 and 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *15-17 and 20* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/22/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-14, 18, and 19, drawn to an extreme ultraviolet light source target, classified in class 250, subclass 504R.

II. Claims 15-17 and 20, drawn to a method of manufacturing an extreme ultraviolet light source target, classified in class 516, subclass 98.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the target claimed in the Group I claims can be made by methods other than those claimed in the Group II claims.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Samuel Dangremond on September 17, 2007, a provisional election was made with traverse to prosecute the invention of Group I, claims 1-14, 18, and 19. Affirmation of this election must be made by applicant in replying to this Office action. Claims 15-17 and 20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-10, 18, and 19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Even though the application discloses some methods of adjusting the density of the extreme ultraviolet light source target during its manufacture, once the target is made, its density is fixed, so there is no disclosure of any means to adjust the density of an existing target, as is claimed in the claims.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-7, 18, and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. These claims are all directed to an extreme ultraviolet light source target that is characterized by the relative locations of a laser absorption region and an extreme ultraviolet light emission region as a result in an adjustment of the density of the target;

however, the target does not have a laser absorption region and an extreme ultraviolet light emission region unless and until it is irradiated by a laser, so any discussion of a laser absorption region and an extreme ultraviolet light emission region of a target in the absence of a laser is meaningless. Furthermore, Claim 3 claims a target density that is a specified percentage of the crystal density of the heavy metal or heavy-metal compound used to make the target, but since the crystal density of a solid body depends on its crystalline structure, which is dependent upon the manufacturing method and the thermal history of the body as well as its chemical composition, the limitation that the density of the target is a specified percentage of the crystal density of the heavy metal or heavy-metal compound used to make the target is inadequately defined.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Konakawa et al. (Japanese Patent Publication 11-345698). Konakawa et al. discloses an extreme ultraviolet target (x-rays produced by plasma resulting from the irradiation of a target by a laser instead of electron beam irradiation of an anode are usually called extreme ultraviolet even though the wavelengths produced overlap the x-ray range) that mixes together a gas and particles of a metal coated with a substance with lower specific gravity than the metal. Konakawa et al. does not describe the density of this metal itself, but paragraph [0036] states that if the target is tiny particles of a metal such as gold coated onto an organic substance such as polystyrene, the

target's "specific gravity W is 2.85" if "the polystyrene specific gravity wl = 1.05, gold's specific gravity w2 = 19, total volume A = 1, the volume of the nucleus substance al = 0.9, and the volume of the substance coating the surface a2 =0.1." Given the metal's specific gravity and the target's specific gravity in this case, the density of the target in which gold is coated onto polystyrene as described by Konakawa et al. appears to be within the numerical range of claim 3. Also, Konakawa et al. teaches at paragraph [0018] that the metal that forms the target may be Sn or W, and, at paragraph [0028], that the laser irradiating the target may be a YAG laser or an excimer laser. Furthermore, it is inherently necessary to adjust the target density to an appropriate range in order to make the laser absorption region near the extreme ultraviolet light emission region, so that the extreme ultraviolet radiation can be extracted from the region where the laser is absorbed, as is illustrated in Drawings 1, 2, and 4; a target whose density is adjusted to the aforesaid region would appear to have the effect of making the laser absorption region near the extreme ultraviolet light emission region. Therefore the target described by Konakawa et al. matches the structure of the target described in claims 1-5 and 8-10 of the instant application, so it appears to have the effect of making the laser absorption region near the extreme ultraviolet light emission region.

Claims 1, 2, and 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Mochizuki (U. S. Patent No. 6,320,937). At lines 16-41 in column 2, Mochizuki discloses a known cryogenic laser plasma x-ray target (that inherently, as is discussed above, also constitutes an extreme ultraviolet light source target) that comprises a liquefied or solidified gas (i.e. a frost of gas) on a tape. As is illustrated in Fig. 3, the EUV light is extracted from the same

point where the laser is absorbed, so the density of the target must inherently be such that the laser absorption region overlaps the extreme ultraviolet light emission region.

Claims 1-6, 8-10, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Choi et al. Choi et al. discloses a laser plasma soft x-ray source (i.e. an extreme ultraviolet light source, as is explained above) that comprises a target that is, in the embodiment discussed at lines 4-7 in the right-hand column on page 1617, a powder of SnO and SnO_2 glued onto a tape and compressed by hand. Such a target inherently includes voids because a human hand is incapable of exerting enough force to eliminate all the voids between the powder particles. As is illustrated in Fig. 1, this target is irradiated by a YAG laser.

Claims 1 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Tillotson et al. (U. S. Patent No. 5,409,683). Tillotson et al. discloses an aerogel body of heavy metal or heavy-metal compound. This body is inherently capable of functioning as an extreme ultraviolet light source target when irradiated by a laser.

Claims 11-14 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose an extreme ultraviolet light source comprising a hopper having an outlet from which frost can be discharged, a freezing machine to cool the hopper, and a heater that intermittently heats the wall of the hopper to release the frost.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (571) 272-2468. The examiner can normally be reached on Monday-Thursday (8:30-7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jack I. Berman
Primary Examiner
Art Unit 2881

jb
9/19/07